

MEMORANDUM

To: Kaaren Hofmann
City Engineer
City of Newberg
414 E First Street
Newberg, Oregon 97132

From: Kathleen Freeman, PE, CFM
Water Resources Project Manager

Cc: Aaron Murphy, PE
Senior Project Manager

Date: January 14, 2022

Project: Crestview Green Planned Unit Development

Project No: 21701

RE: Wastewater System



EXPIRES: 12/31/2023

The proposed Crestview Green Planned Unit Development (PUD) is located along OR 99W between the Crestview Crossing Development to the west and NE Benjamin Road to the east within the City of Newberg, Oregon. The site consists of two tax lots (3S2W16 900 & 1000) totaling 10.58 acres and contains two private residences, gravel and asphalt driveways and several outbuildings. The rest of the property is used for farming and is undeveloped. All existing structures and driveways will be demolished for the proposed development.

The Crestview Green PUD was included in the wastewater analysis for the adjacent Crestview Crossing development. The analysis and system sizing were presented in the Proposed Wastewater System (PWWS) report, dated May 13, 2021 by 3J Consulting. The City's Wastewater Master Plan (WWMP), written in March 2018 was utilized to determine post-construction design flows on both sites, as well as upstream basins (current and future). The Proposed Wastewater System report has been attached for reference.

In May of 2021, the City released a Technical Update to the March 2018 WWMP (Appendix K) which incorporated the modeling from the PWWS report.

The purpose of this memorandum is to show that the analysis and design performed in the PWWS report for Crestview Crossing (including Crestview Green PUD) will continue to be valid under the 2021 Technical Update.



Appendix K – WWMP Technical Update, May 2021

The Technical Update (TU) incorporated E Crestview Drive and Crestview Crossing projects into the master plan modeling since they were both in construction at the time of the update. Figure ES-2 of the TU shows the E Crestview Drive and Crestview Crossing (including Crestview Green PUD) are all part of the Springbrook Basin and Fernwood Subbasin (See Attached: Figure ES-2).

As the TU states, “The new infrastructure on E Crestview Drive redirects some future flows from growth areas north to the east and downstream to the Fernwood Pump Station, changing the Fernwood drainage basin from the 2018 WWMP. Crestview Crossing preliminary utility report was used to add infrastructure and base loads to the model update.” (pg. ES-3)

Proposed Wastewater System report, dated May 13, 2021 by 3J Consulting

Under the direction of the City, the basin analysis and pipe sizing for the Crestview Crossing wastewater system included the areas described in the TU (See Attached: Public Utilities Map). The conclusion from the report states “The XPSTORM Models show that the peak flows for the proposed system will operate well below surcharging condition for the whole site. Additionally, the added flow from the proposed development and offsite areas not currently captured by the downstream system will be within the available pumping capacity of the Fernwood lift station”.

Crestview Green PUD Proposed Public Pump Station

A public pump station is proposed for the new Crestview Green PUD. The pump station will be located in the northeast corner of the site near but not in the existing wetland. The pump station will service all of the proposed PUD connecting an 8” sanitary line to the existing line from the Crestview Crossing site at the intersecting property lines on E Willakenzie Street.

Conclusion

The analysis and design performed in the PWWS report for Crestview Crossing (including Crestview Green) will continue to be valid under the 2021 Technical Update.

Attachments:

- Proposed Wastewater System (PWWS) report, dated May 13, 2021 by 3J Consulting
- Figure ES-2

- - - END OF DOCUMENT - - -



3J CONSULTING

CIVIL ENGINEERING | WATER RESOURCES | LAND USE PLANNING

PROPOSED WASTEWATER SYSTEM

Crestview Crossing
Newberg, OR

May 13, 2021
Revised from March 28, 2019

Prepared For:

JT Smith Companies
5285 Meadows Road
Lake Oswego, OR 97035

Prepared By:
3J Consulting, Inc.
5075 Griffith Drive, Suite 150
Beaverton, Oregon 97005
Project No: 17393
KEF/JBC

TABLE OF CONTENTS

EXECUTIVE SUMMARY	1
PROJECT DESCRIPTION.....	2
EXISTING CONDITIONS	3
Existing Conditions	3
Existing Wastewater System	3
WASTEWATER ANALYSIS	3
Post-Developed Conditions.....	3
SS Flow Calculations	4
HYDROLOGIC ANALYSIS.....	4
XPSTORM Input.....	4
Downstream Conveyance	5
Fernwood Lift Station	5
SUMMARY	5
TECHNICAL APPENDIX	A
REFERENCES	A
EXHIBITS.....	A
CALCULATIONS.....	B
XPSTORM OUTPUT	C

LIST OF FIGURES

Figure 1 - Vicinity Map.....	2
Figure 2 - Site Location.....	3

LIST OF TABLES

Table 1 - Wastewater Flows.....	4
--	----------

EXECUTIVE SUMMARY

The purpose of this report is to describe the proposed wastewater system for the Crestview Crossing development and show that it meets the City of Newberg standards. The project is located along OR 99W between Vittoria Way and NE Benjamin Rd in the City of Newberg, OR and consists of two tax lots (3216AC 13800 & 1100). The total area of the two tax lots is 33.11 acres containing a private residence and several outbuildings. The rest of the property is used for farming and is undeveloped. All existing structures and the driveway will be demolished for the proposed development. A commercial development consisting of 4.40 acres will be developed by others.

The proposed project will consist of subdividing the property into 248 single-family residential lots, a future two-building apartment complex with clubhouse and new roads and sidewalks. A commercial development will be constructed by others but has been accounted for in the future wastewater design flows. The two existing lots directly to the east of Crestview Crossing have been included as well. The City of Newberg requires a wastewater study that includes a study map, wastewater flow calculations and pipe hydraulic calculations.

The City's Wastewater Master Plan (WWMP), written in March, 2018 has been utilized to determine post-construction design flows on the site. The WWMP uses land use zoning to determine the existing and future flows. The proposed development zoning will differ slightly from the WWMP. Additionally, the City has requested to include several offsite areas that, either currently have underground septic systems or topography sloping away from the proposed development, which were not included in the City's WWMP.

The proposed wastewater system was modeled using the computer software program XPSTORM along with calculated flow rates (modeled as constant flow) to determine the pipe sizes of the proposed system. The flow rates were calculated using Table 4-2 of the WWMP.

The XPSTORM Models shows that the peak flows for the proposed system will operate well below surcharging condition for the whole site. Additionally, the added flow from the proposed development and offsite areas not currently captured by the downstream system will be within the available pumping capacity of the Fernwood lift station.

This report has been revised to show that the wastewater system and Fernwood lift station will have capacity to convey flows from the properties east of the Crestview Crossing site assuming an R-3 zoning.



PROJECT DESCRIPTION

The project is located along OR 99W between Vittoria Way and NE Benjamin Rd in the City of Newberg, OR and consists of two tax lots (3216AC 13800 & 1100). The total area of the two tax lots is 33.11 acres containing a private residence and several outbuildings. The rest of the property is used for farming and is undeveloped. All existing structures and the driveway will be demolished for the proposed development. A commercial development consisting of 4.40 acres will be developed by others but has been accounted for in this analysis.

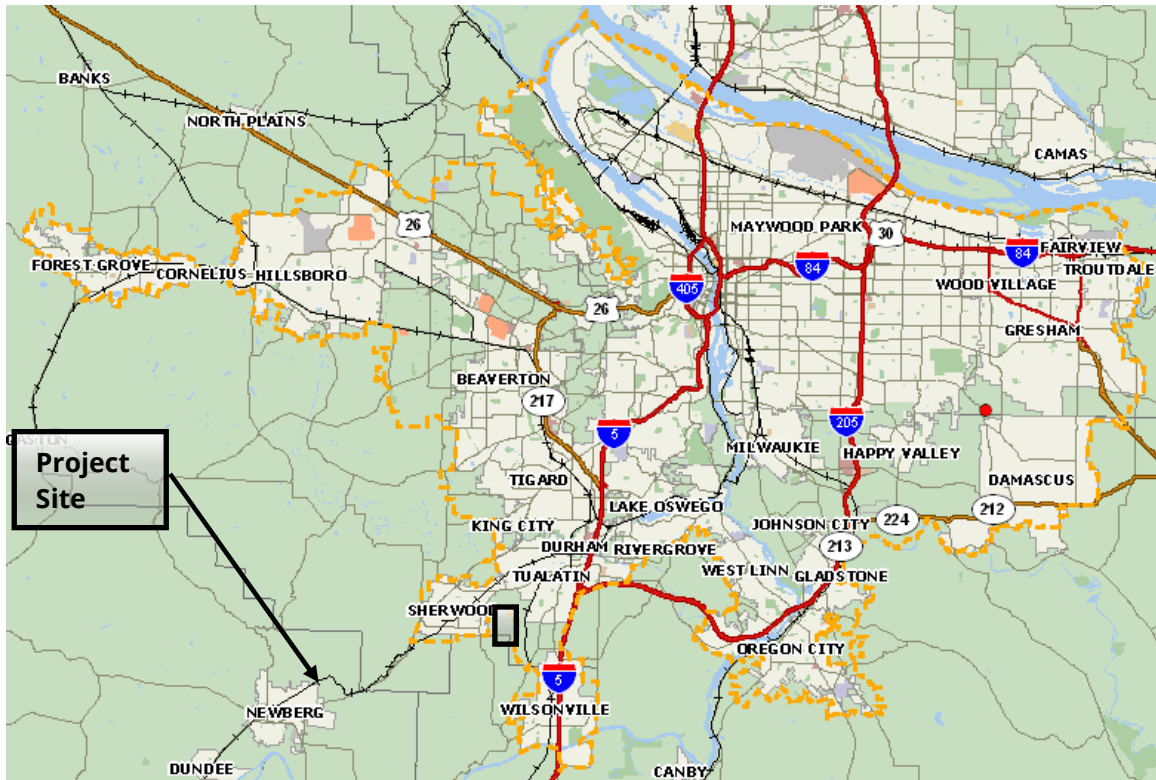


Figure 1 - Vicinity Map



Figure 2 - Site Location

EXISTING CONDITIONS

Existing Conditions

The existing site contains a private residence, driveway and outbuildings. All existing structures will be demolished for the proposed development.

Existing Wastewater System

There is currently no existing wastewater system onsite. The properties to the north utilize underground septic systems for the wastewater volumes. The properties to the west are conveying wastewater flows southwest into an existing wastewater system. There is currently no existing wastewater system on the properties to the east.

WASTEWATER ANALYSIS

Post-Developed Conditions

The proposed project and offsite areas will consist of four zones: R-1, R-3, C-2 and SD/V (See Technical Appendix: Exhibits – Crestview Crossing Sewer Basins). The C-2 area is a commercial development that will be designed by others; however, we have accounted for this area in the design flow calculations. The proposed site will connect into the existing 24" wastewater line approximately 780 feet south of the site across from Highway 99.



SS Flow Calculations

The future flows for the proposed site, commercial area, and future upstream basins were calculated using Table 4-2 of the City of Newberg's Wastewater Master Plan published in 2018. The estimated flows were based on zoning for the proposed development and differ slightly from the WWMP. Flow rates for the commercial area were calculated using 3,000 gal/acre/day which is more than twice of that used in Table 4-2 as a conservative approach since it is not known exactly what will be constructed (See Technical Appendix: Calculations – Crestview Crossing Post-Construction Wastewater Flow Calculations). Additionally, per section 2.3.4 of the City's Public Works Design and Construction Standards, an allowance of 1,000 gpad for inflow and infiltration was added to each calculated flow. Lastly, per comments from the City, a base flow of 73,000 gpd was added to the proposed wastewater line.

There are two upstream basins that may contribute future flow to the proposed sanitary system for Crestview Crossing. The lots north of the proposed site are currently on septic, but in the future could connect sanitary to the proposed system for the site. The basin just north of the site is assumed to be zoned R-1 based on lot size. Additionally, a large undeveloped area northwest of the site could convey sewage to the proposed system. This area will be developed as part of the Springbrook District (See Technical Appendix: Exhibits – Sewer Basins) and is zoned as R-1 and C-3. The properties east of the site were assumed to develop as R-3 zoned.

Downstream of the site there are also two basins that may contribute flow to the existing 24" pipe. The properties south of the site are currently on septic, but in the future may discharge sewage to the existing 24" pipe. This property is assumed to be zoned R-1 based on the average lot size. Also, the Providence Newberg Medical Facility will discharge sanitary flows to the system. This property is zone Industrial and per Table 4-2 of the WWMP, a flow rate of 2,000 gpad was accounted for in the 24" pipe.

HYDROLOGIC ANALYSIS

XPSTORM Input

The City of Newberg's ArcGIS Public Utility Map was used to model the existing downstream system to the Fernwood Lift Station. The WWMP work did not include modeling the existing 24" pipe that the proposed system will connect to. Therefore, information from the City's mapping system was utilized to create the post-developed model (See Technical Appendix: Exhibits – City of Newberg GIS: Downstream WW System).

Table 1 below shows the calculated flow rates for each zone within the wastewater sewer basin (See Technical Appendix: Calculations – Wastewater Flow Calculations). The flows (in cfs) were added into the XPSTORM model as constant flows.

Zoning	Flow (gpd)	Flow (cfs)	Add to MH
R-1	152,906	0.232	N/A
R-3	100,570	0.198	N/A
C-2	13,720	0.021	N/A
SD/V	47,142	0.073	N/A
Increase in Flow to Existing 24" Pipe and Fernwood Lift Station	314,338	0.525	WWMHJ102130
I	72,960	0.1129	WWMHJ111061

Table 1 - Wastewater Flows



A 36,500 gpd of base flow was added to the two most upstream proposed manholes (SSCO A1 & SSCO B1) in the model, for a total of 73,000 gpd to account for any potential rerouting of existing sanitary flow to the proposed system.

Downstream Conveyance

The XPSTORM Conveyance Data shows that the flows in the existing 24" conveyance pipe for both existing and post-developed conditions do not exceed the conveyance capacity of the pipe (See Technical Appendix: XPSTORM Output – Proposed Wastewater Conveyance Data). In all pipe segments, the flow is less than the capacity and the flow depth is less than the pipe diameter.

Fernwood Lift Station

Per the WWMP, the Fernwood Lift Station has three pumps, each with a 900 gpm capacity. Per Table 3-3 in the WWMP, the average field test flow rate through the lift station is 670 gpm. The added flow from the proposed development at Crestview Crossing and the other basins that will discharge to the existing 24" pipe is 287 gpm (0.0.638 cfs); therefore, the total flow will be approximately 939 gpm. The pump station has capacity to handle the flow from the proposed Crestview Crossing project and the future upstream basins with the use of two pumps, leaving one additional pump as a backup.

S U M M A R Y

The existing downstream 24" wastewater pipe that the proposed Crestview Crossing will connect to will have the capacity to convey the increase in flow from the development and future upstream basins. The Fernwood Lift Station pumps will have the capacity to pump the additional flow.



TECHNICAL APPENDIX

Exhibits

- Public Utilities Map (email PDF from City's Comments)
- Crestview Crossing Sewer Basins
- Table 4-20: 20-Year Projected Flows by Zoning, City of Newberg WWMP, 2018
- City of Newberg GIS: Downstream System
- Public Utility Map
- Table 3-3: Measured Pump Flow Rates, City of Newberg WWMP, 2018
- Newberg Zoning Map
- Springbrook – Proposed Land Use District Map
- Springbrook – Development Standards Matrix

Calculations

- Wastewater Flow Calculations

XPSTORM Output

- XPSTORM Hydraulic Layout
- XPSTORM Wastewater Conveyance Data – Existing Conditions for Downstream 24" Pipe
- XPSTORM Wastewater Conveyance Data – Post-Developed Conditions for Downstream 24" Pipe
- Downstream 24-inch WW Pipe with Post-Developed Flow from Crestview Crossing

REFERENCES

1. City of Newberg Public Works Design and Construction Standards, August 2015
2. City of Newberg Wastewater Master Plan, March 2018



EXHIBITS

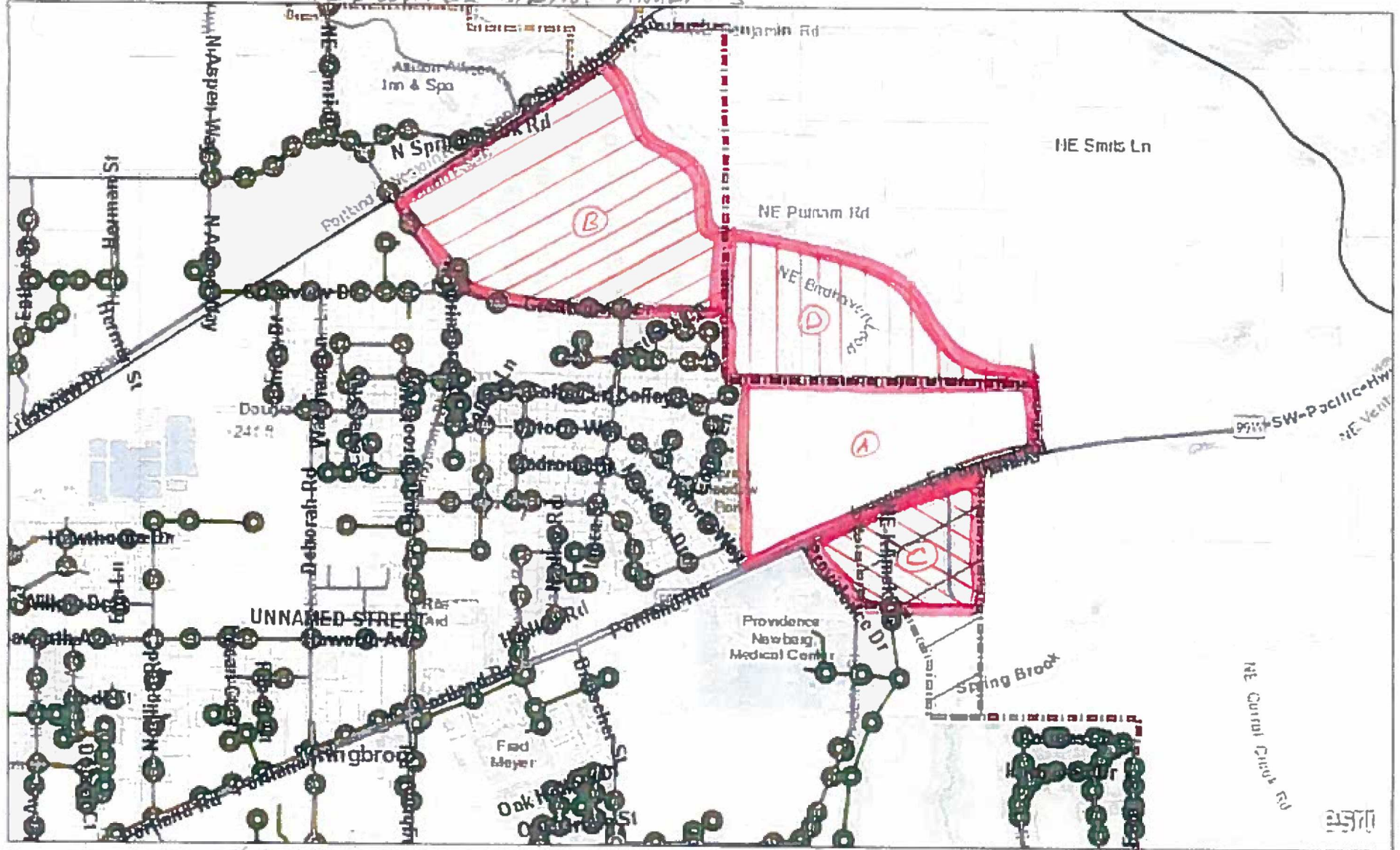
7/2018

Public Utilities Map

CRESTVIEW CROSSING PLUD
BASIN STUDY AREAS FOR
WASTEWATER SIZING ANALYSIS

Public Utilities Map

PER DIRECTION OF THE
CITY ENGINEER.

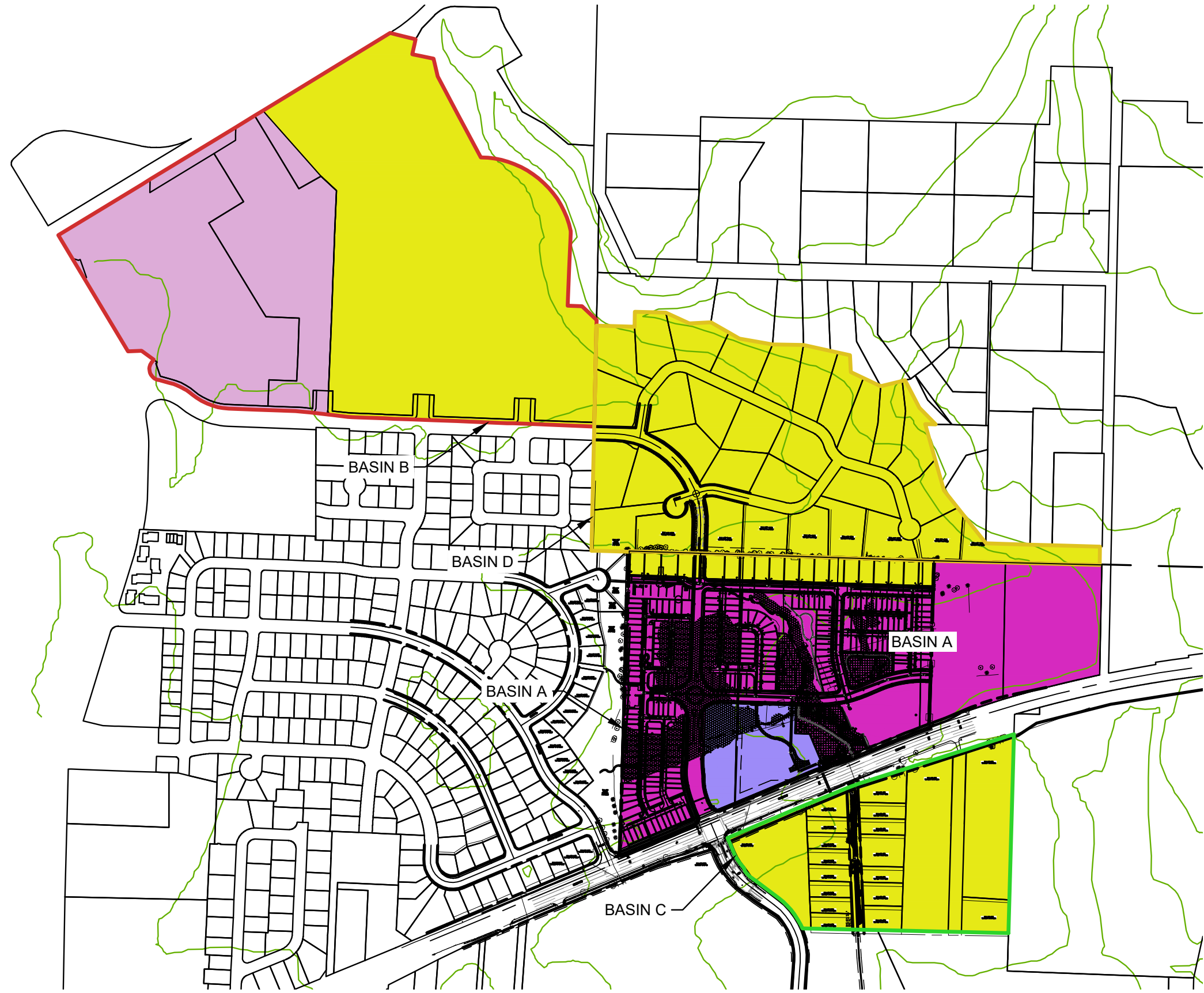


* ANALYSIS TO INCLUDE A BASE FLOW OF 73,000 gpd FOR POTENTIAL

REBOUTING OF EXISTING FLOWS TO A NEW WASTEWATER LINE.

Oregon Metro, Bureau of Land Management, State of Oregon, State of Oregon DOT, State of Oregon GEO, Esri Canada, Esri, HERE, Garmin, INCREMENT P, USGS, METI/NASA, EPA, USDA | Pictometry | City of Newberg Planning Department | City of Newberg GIS

ANALYSIS OF THE FERNWOOD LIFT STATION TO INCLUDE THE
FULL FERNWOOD LIFT STATION BASIN AND THE ABOVE UPSTREAM
BASINS. SEE FIGURE 7 FROM THE WASTEWATER MAINTENANCE



LEGEND

- ZONING R-1 (LOW DENSITY RESIDENTIAL)
- ZONING R-3 (HIGH DENSITY RESIDENTIAL)
- ZONING C-2 (COMMUNITY COMMERCIAL)
- ZONING SD/V (SPRINGBROOK DEVELOPMENT - VILLAGE)
- BASIN A
- BASIN B
- BASIN C
- BASIN D

BASIN	ZONING	AREA (AC)
A	R-1	¹ 2.703
	R-3	¹ 24.985
	C-2	² 3.430
B	R-1	¹ 30.497
	⁴ SD/V	¹ 20.952
³ C	R-1	¹ 18.272
³ D	R-1	¹ 28.407

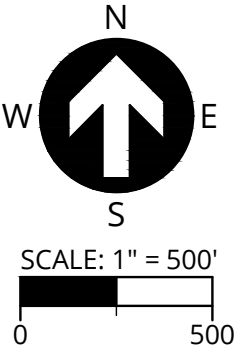
PROPOSED STORM FACILITIES: AREAS NOT INCLUDED

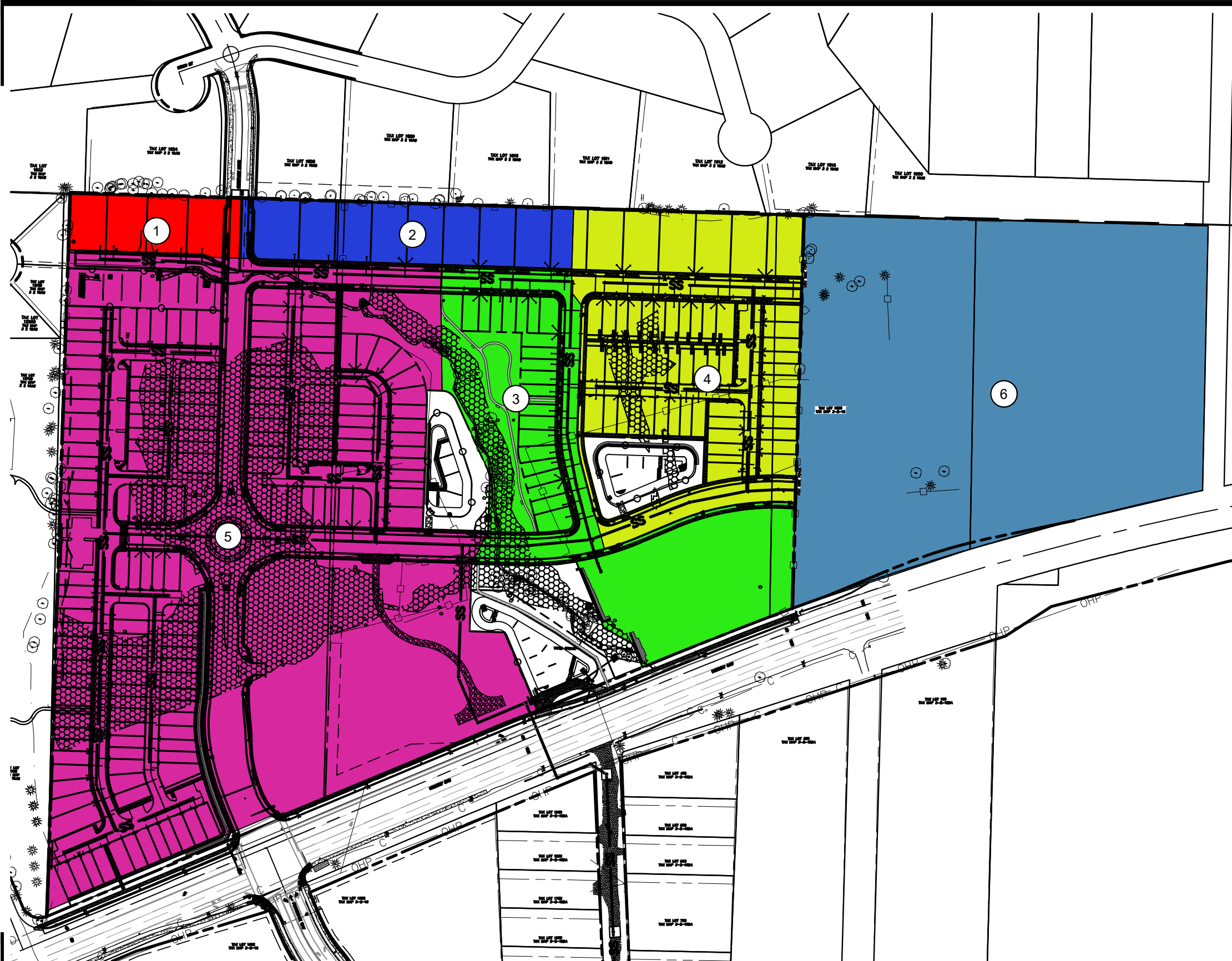
¹PER WWMP, 25% OF THE AREA IS ALLOCATED TO ROAD, SIDEWALKS, ETC

²PER WWMP, 20% OF THE AREA IS ALLOCATED TO ROAD, SIDEWALKS, ETC

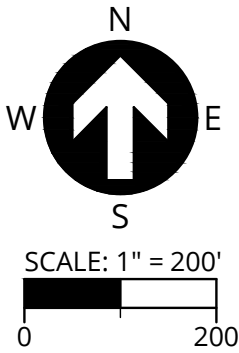
³ASSUMED LOW DENSITY RESIDENTIAL (R-1) BASED ON AVERAGE LOT SIZE.

⁴SPRINGBROOK DISTRICT - VILLAGE (DESIGNATED ZONING C-3). SEE SPRINGBROOK-PROPOSED LAND USE DISTRICT MAP AND SPRINGBROOK DEVELOPMENT STANDARDS MATRIX FOR MORE INFORMATION.





BASIN	ZONING	AREA (ACRES)	DRAINS TO
①	R-1	0.627	SSMH C3
②	R-1	1.215	SSMH C3
③	R-3	3.620	SSMH C1
④	R-1	0.848	SSMH B7
	R-3	2.821	SSMH B7
⑤	R-3	10.576	SSMH B4x
	C-2	3.430	SSMH B4x
⑥	R-3	7.981	SSCO B1



CRESTVIEW CROSSING

05/13/2021

JT SMITH

ONSITE SEWER BASINS

3J CONSULTING
CIVIL ENGINEERING . WATER RESOURCES . COMMUNITY PLANNING

^ARecommended Standards for Wastewater Facilities (Great Lakes – Upper Mississippi River Board, 2014 edition).

Modeled gravity main slopes were compared with these recommended minimum slopes. The mains that are less than their recommended minimum slope are shown in Figure 11 (Appendix A). Pipes with inverse slopes are highlight in this figure as well. Low or inverse slopes can cause capacity issues and require higher than normal O&M. These mains should be monitored for capacity, odor, and solids buildup problems. All pipes in the collection system should be on a regular maintenance schedule. Pipes with low slopes may need to be cleaned more frequently to prevent solids buildup and flow disruption.

4.2 FUTURE COLLECTION SYSTEM PERFORMANCE

This section summarizes future flow projections and the model evaluation of future system expansion, and documents anticipated future deficiencies. Alternative improvements to address these deficiencies are presented in Section 5.

4.2.1 Future Flow Projections & Model Scenarios

Future loads were distributed based on PSU population projections (Section 2) and City projected future residential, commercial, and industrial growth. Flows per capita for projected population growth were assumed to be similar to existing flows per capita. Residential flows were projected using future growth area, average lot size, population density, and ADWF per capita attributed with residential contributions. Commercial, industrial, and institutional flows were projected using future growth areas indicated by City planning staff and typical flow per acre values (Metcalf and Eddie, 3rd Edition). Projected flows per zoning designation for the 20-year planning period are presented in Table 4-2. Projected flows per zoning designation for buildout are presented in Table 4-3.

Table 4-2: 20-Year Projected Flows by Zoning

Zoning	Average Lot Size ^A (ac)	Pop. Density ^{A, B} (people/ac)	Flow ^C (gpad)	Future Growth Area ^A (ac)	Flow ^D (gpd)
R-1	0.227	12	880	388	334,500
R-2	0.111	24	1,801	99	213,800
R-3, R-4	0.061	44	3,301	37	131,700
M-1, M-2, M-3	N/A	N/A	1,250	109	135,700
C-1, C-2, C-3	N/A	N/A	1,250	61	76,700
I	N/A	N/A	2,000	56	113,000
Infill	N/A	N/A	N/A	N/A	40,100
Totals:				751	1,046,000

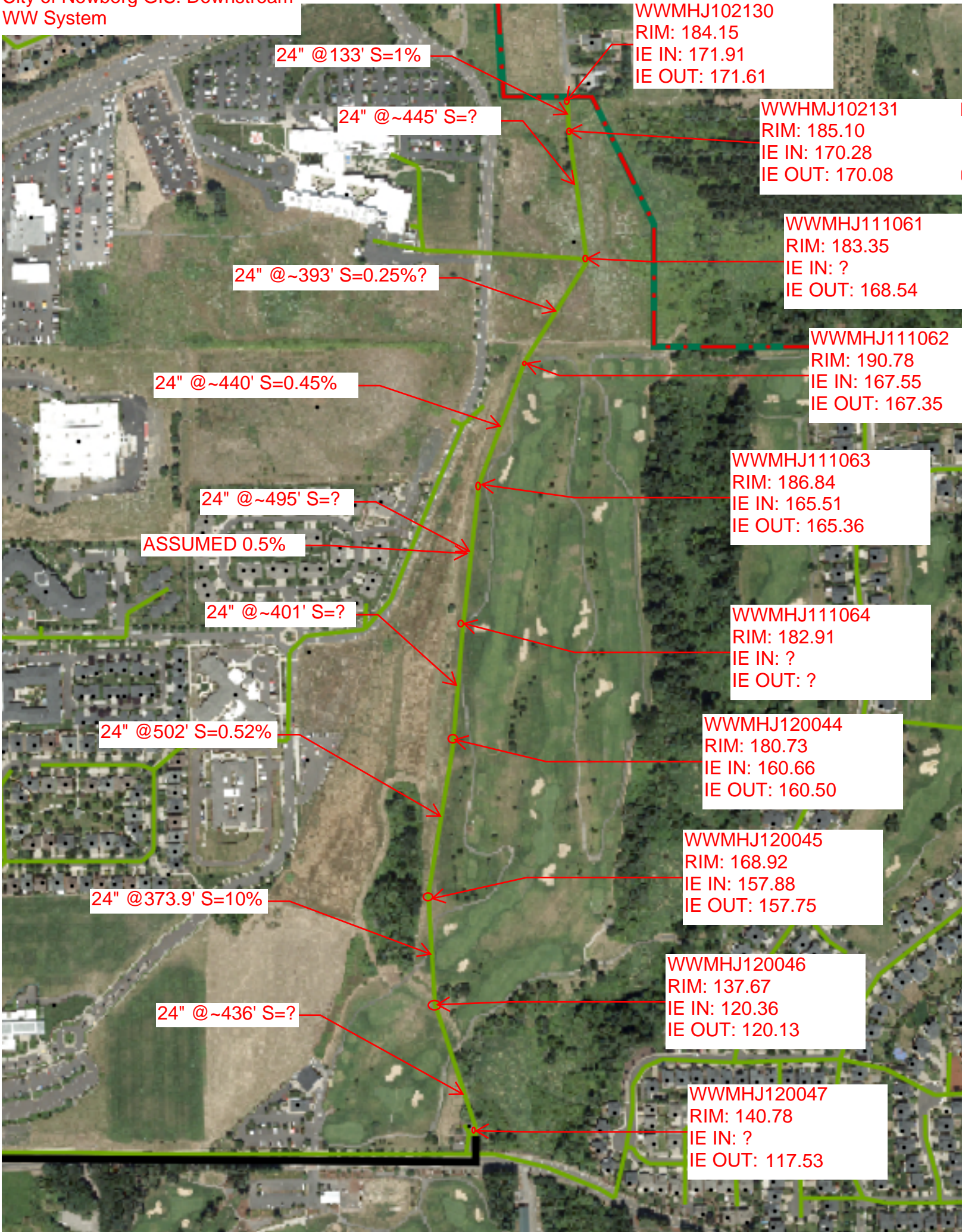
^AAllocates 25% of area for roads and other public dedication, except on industrial and commercial zones, where 20% is allocated.

^BAssume 2.69 people/dwelling unit (2010 US Census).

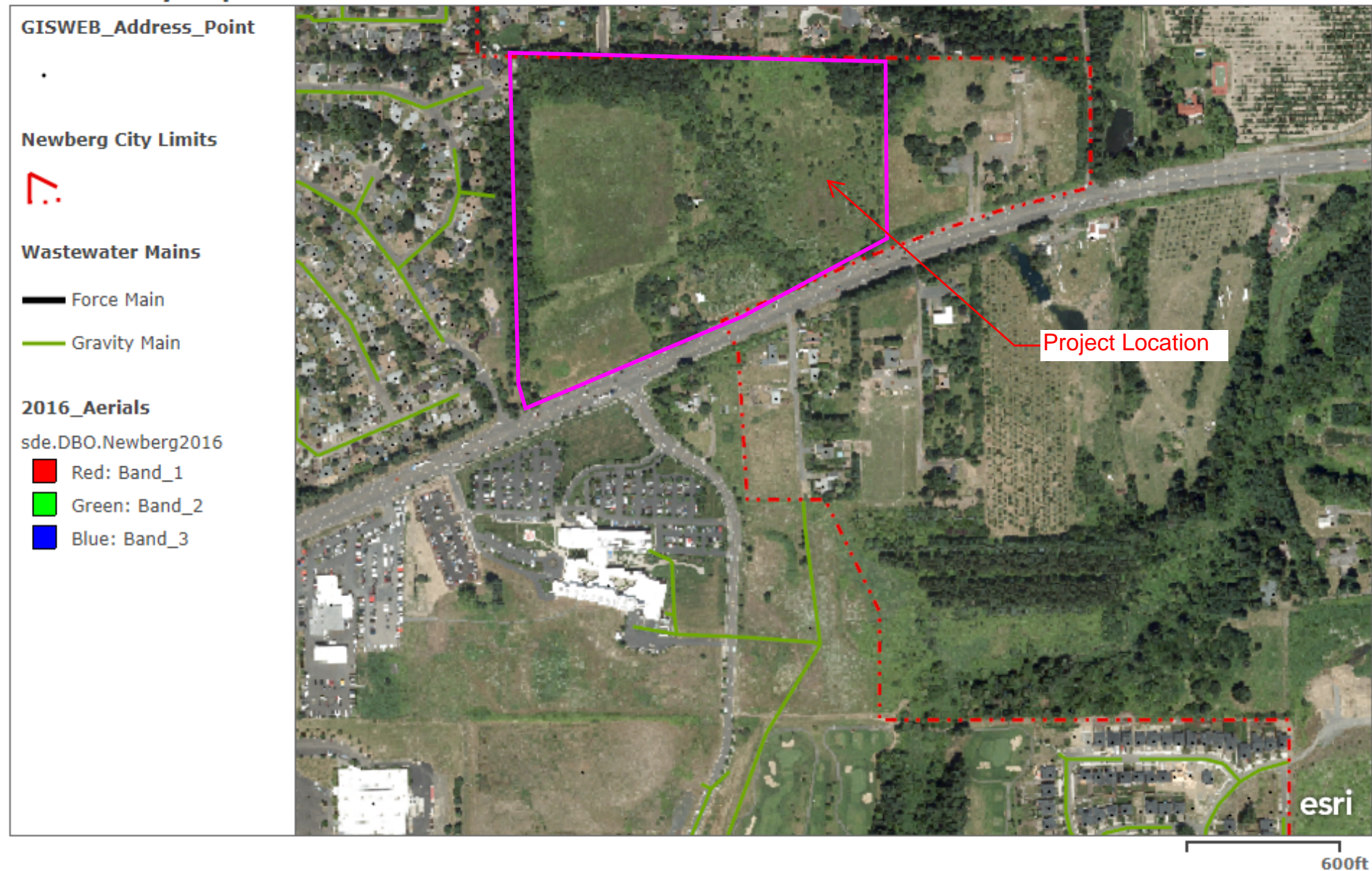
^CResidential flows based on design ADWF per capita value of 99 gpcd (Table 2-5) then reduced by 25% accounting for removal of the industrial, commercial and institutional flows that contribute to the derivation of the 99 gpcd value. Industrial, commercial, and institutional flows based on typical flow per acre values (Metcalf and Eddie, 3rd Edition).

^DUtilizes average annual dry-weather flows.

City of Newberg GIS: Downstream
WW System



Public Utility Map



Oregon Metro, Bureau of Land Management, State of Oregon, State of Oregon DOT, State of Oregon GEO, Esri Canada, Esri, HERE, Garmin, INCREMENT P, Intermap, USGS, METI/NASA, EPA, USDA | Pictometry | City of Newberg Planning Department | City of Newberg, Planning Department | Originally created by Jan Wolf 2007-present

to the SCADA, but will turn the pumps on (high) or off (low) if the water level reaches the floats. It is recommended that the floats be connected to the SCADA to send out unique alarms for the high/low water levels.

Drawdown Tests

During the site visit, drawdown pump tests were completed to review wet well conditions and determine approximate pump flow rates. Each pump and pumping combination were tested at all lift stations. Dayton and Fernwood have depth readouts on their PLCs that were used to record depth over time. The Highway 240 Lift Station has a flow meter on its discharge pipe, allowing for measured flow rates to be recorded over time. Andrew, Charles, Chehalem (pressure transducer was not operational at time of tests), Creekside, and Sheridan do not have continuous depth measurement readouts; for these lift stations, depth to the water surface was measured manually during testing. Estimates for average pump flow rates were calculated using the pump test data. These estimated flow rates, along with the rated pump capacities, are shown in Table 3-3. For the majority of the lift stations, the calculated flow rate was relatively close to the reported pump capacity. Dayton has had historical problems with pump capacity and overflows, which are discussed in more detail in the Dayton Lift Station section. Fernwood field test results are lower than expected.

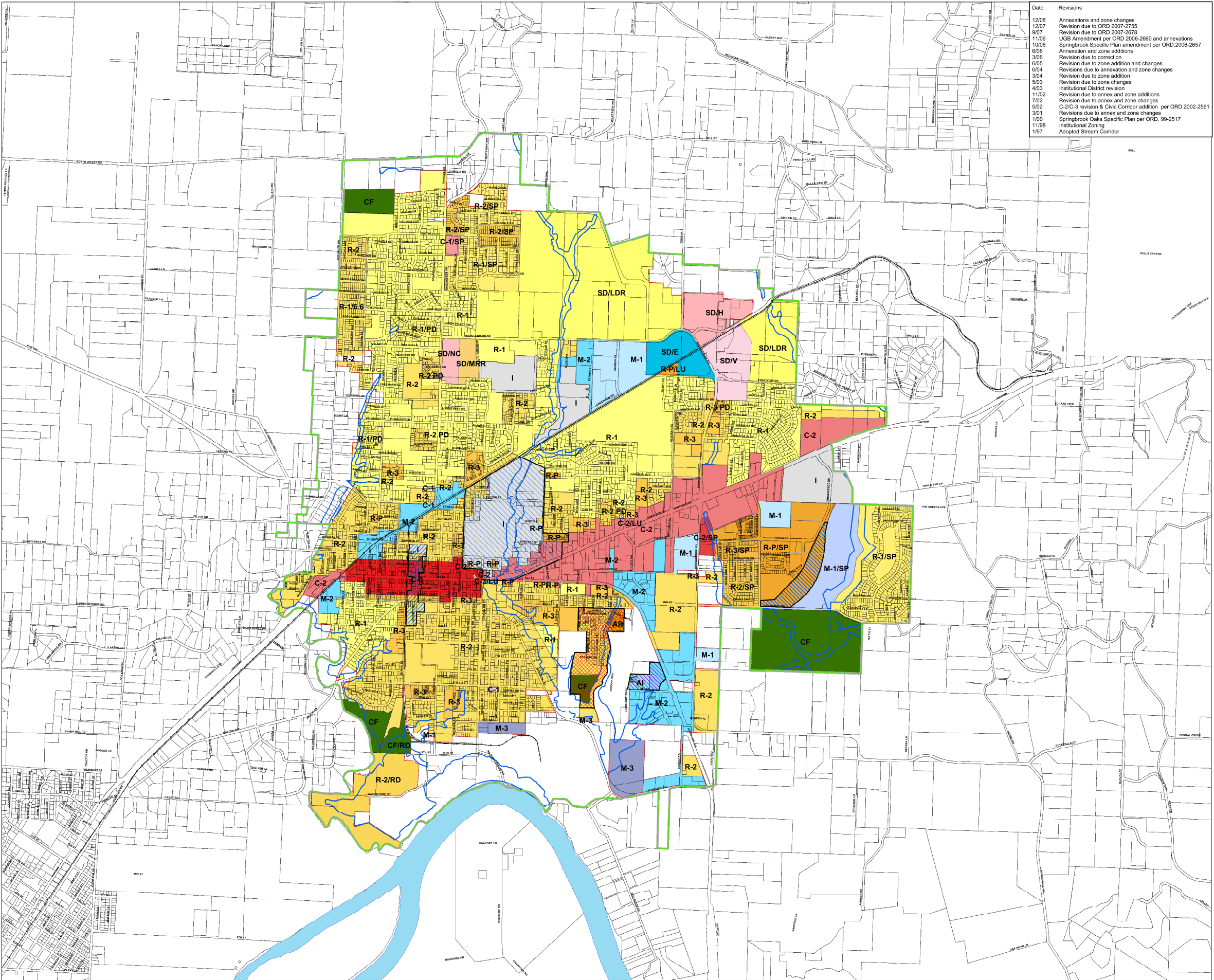
Table 3-3: Measured Pump Flow Rates

	Avg Field Test Flow Rate (gpm)	Reported Pump Capacity (gpm)
Andrew	140	155
Charles	150	150
Chehalem	660	630
Creekside	190	153
Dayton ¹	1,300	2,100
Fernwood	670	900
2 Pumps	1,210	-
Highway 240	910	1,010
2 Pumps	1,230	-
Sheridan	180	115

¹As reported by RH2, April 2016 (Appendix C)

Housekeeping/Maintenance

Interiors of the lift station buildings are being kept in very good condition. Floors and walls are clean, painted, and maintained. The wash-down hose (which should be stored off of the ground) was found on the floor at a few of lift stations. The source of wash-down water is a hose bib on the lift station side of a backflow preventer fed by a water source. Backflow preventers should be installed at least 12-inches aboveground to facilitate proper operation, maintenance, and inspection. The backflow preventer is located in an insulated fiberglass cover. Some covers have electric heaters – while others have heat tape – to prevent freezing at the backflow preventer. Heat tape is not



Date	Revisions
12/08	Annexations and zone changes
12/07	Revision due to ORD 2007-2755
9/07	Revision due to ORD 2007-2678
11/06	UGB Amendment per ORD 2006-2660 and annexations
10/06	Springbrook Specific Plan amendment per ORD 2006-2657
6/06	Annexation and zone additions
3/06	Revision due to correction
6/05	Revision due to zone addition and changes
6/04	Revisions due to annexation and zone changes
3/04	Revision due to zone addition
5/03	Revision due to zone changes
4/03	Institutional District revision
11/02	Revision due to annex and zone additions
7/02	Revision due to annex and zone changes
5/02	C-2/C-3 revision & Civic Corridor addition per ORD 2002-2561
3/01	Revisions due to annex and zone changes
1/00	Springbrook Oaks Specific Plan per ORD 99-2517
11/98	Institutional Zoning
1/87	Adopted Stream Corridor

City of Newberg, Oregon

NEWBERG ZONING MAP

Including the Urban Growth Boundary

Limited Use Bypass Corridor Overlay

Airport Industrial Overlay

Airport Residential Overlay

Institutional Overlay

Urban Growth Boundary

Stream Corridor

City Limits

Civic Corridor Overlay

ZONING

C-1 Neighborhood Commercial

SDV Springbrook District - Village

SDNC Springbrook District - Neighborhood Commercial

SDH Springbrook District - Hospitality

C-1/SP Specific Plan

C-2 Community Commercial

C-2/LU Community Commercial/Limited Use

C-2 PD Planned Unit Development

C-2/SP Specific Plan

C-3 Central Business District

C-3/LU Central Business District - Limited Use

CF Community Facility

CFRD Community Facility Riverfront District

I Institutional

M-1 Limited Industrial District

M-1/SP Specific Plan

AI Airport Industrial

M-2 Light Industrial District

SDIE Springbrook District - Employment

M-3 Heavy Industrial District

R-1 Low Density Residential

SD/LDR Springbrook District - Low Density Residential

R-1 PD Planned Unit Development

R-10.1 Low Density 0.1 d.u./ac.

R-10.4 Low Density 0.4 d.u./ac.

R-16.6 Low Density 6.6 d.u./ac.

R-1/SP Specific Plan

R-2 Medium Density Residential

R-2 PD Planned Unit Development

R-2 RD Riverfront District

R-2/SP Specific Plan

SDMRR Springbrook District - Mid-Rise Residential

R-3 High Density Residential

R-3 PD Planned Unit Development

R-3/SP Specific Plan

R-P Residential Professional

R-P/SP Specific Plan

R-P/LU Residential Profession - Limited Use Overlay

AR Airport Residential

IMPORTANT NOTICE TO ALL USERS:

DISCLAIMER AND LIMITATION OF LIABILITY
This information is not guaranteed to be accurate and may contain errors and omissions. The City of Newberg provides NO WARRANTY AS TO THE MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE FOR ANY INFORMATION HEREIN.

This map is created from various data sources and is subject to change without notice. This map is intended for general planning purposes only.

N

E

S

W

0

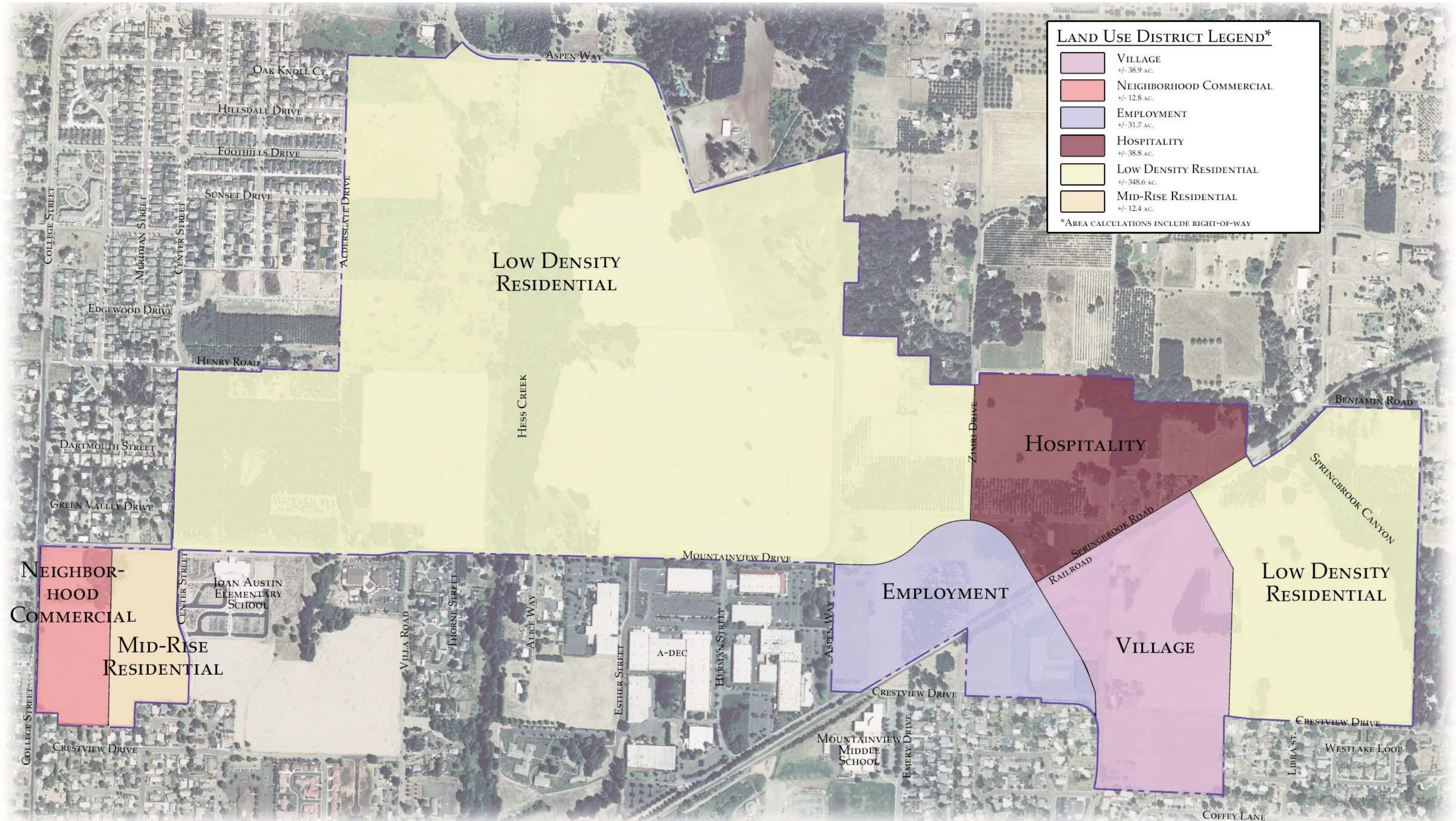
1,000

Feet

City of Newberg

Map created by Jan Wolf
Public Works Department - Engineering

Last Update: Tuesday, May 19, 2009
File: C:\Data\MapInfo\mxd
The most current edition of this map can be found at www.ci.newberg.or.us



SPRINGBROOK

DEVELOPMENT STANDARDS MATRIX						
DEVELOPMENT STANDARDS	LOW DENSITY RESIDENTIAL	MID-RISE RESIDENTIAL	NEIGHBORHOOD COMMERCIAL	EMPLOYMENT	VILLAGE	HOSPITALITY
ALLOWED USE*	<ul style="list-style-type: none"> ❖ Detached Dwelling Units ❖ Manufactured Home ❖ Accessory Dwellings ❖ Home Occupations ❖ Passive or Active Use Parks ❖ Agriculture ❖ Civic Uses: <ul style="list-style-type: none"> Post Office Museum Community Center Library School ❖ Day Care ❖ Group Care Facilities ❖ Church ❖ Transportation facilities and improvements and utility services ❖ Any other building or use determined to be similar to uses listed in this District 	<ul style="list-style-type: none"> ❖ Attached Dwelling Units ❖ Manufactured Home ❖ Detached Dwelling Units ❖ Multi-Family Units ❖ Home Occupations ❖ Passive or Active Use Parks ❖ Agriculture ❖ Civic Uses: <ul style="list-style-type: none"> Post Office Museum Community Center Library ❖ Day Care ❖ Group Care Facilities ❖ Church ❖ Transportation facilities and improvements and utility services ❖ Any other building or use determined to be similar to uses listed in this District 	<ul style="list-style-type: none"> ❖ Retail ❖ Restaurants ❖ Office ❖ Medical Clinics ❖ Financial Institutions ❖ Agriculture ❖ Civic Uses: <ul style="list-style-type: none"> Post Office Museum Community Center Library ❖ Day Care ❖ Group Care Facilities ❖ Transportation facilities and improvements and utility services ❖ Services for local residents, such as laundromat or barber ❖ Any other building or use determined to be similar to uses listed in this District 	<ul style="list-style-type: none"> ❖ Industrial Offices (knowledge-based industries where services are primarily provided outside the community) ❖ Light Industrial ❖ Supporting Retail (directly serving the employment district, such as a deli or printing service) ❖ Day Care ❖ Agriculture ❖ Transportation facilities and improvements and utility services ❖ Any other building or use determined to be similar to uses listed in this District 	<ul style="list-style-type: none"> ❖ Retail ❖ Restaurants ❖ Attached Dwelling Units ❖ Manufactured Home ❖ Multi-Family Units ❖ Home Occupations ❖ Church ❖ Artist Studios ❖ Passive or Active Use Parks ❖ Agriculture ❖ Civic Uses: <ul style="list-style-type: none"> Train Depot Community Center Museum Post Office Library ❖ Day Care ❖ Group Care Facilities ❖ Financial Institutions ❖ Winery ❖ Medical Clinics ❖ Office ❖ Transportation facilities and improvements and utility services ❖ Any other building or use determined to be similar to uses listed in this District 	<ul style="list-style-type: none"> ❖ Hotel ❖ Restaurants ❖ Spa ❖ Meeting Facilities ❖ Detached Dwelling Units, limited to vacation or transitory use or units for employees or caretakers of other uses within the Village or Hospitality areas ❖ Manufactured Home ❖ Home Occupations ❖ Retail ❖ Museum ❖ Artist Studios ❖ Group Care Facilities ❖ Agricultural Production or Processing ❖ Passive or Active Use Parks ❖ Transportation facilities and improvements and utility services ❖ Any other building or use determined to be similar to uses listed in this District
PROHIBITED USE	Home Occupation Signs	Home Occupation signs	Drive throughs, outside storage; temporary storage allowed	Outside storage or processing of materials	Drive throughs, outside storage; temporary storage allowed	
NEWBERG ZONE DISTRICT MODELED AFTER **	R-1	R-2 and R-3	C-1	M-1, but office is not allowed	C-3	No comparison
BUILDING AND SITE STANDARDS						
BUILDING HEIGHT	R-1	35 feet	C-1	M-1	C-3	Five stories or 75 feet

CALCULATIONS

ONSITE WASTEWATER FLOW CALCULATIONS

BASIN	Zoning	¹ Average Lot Size (ac)	DU/Average Lot Size (DU/ac)	¹ People/ DU	² ADWF (gpcd)	Flow (gpad)	³ I/I (gpad)	Flow + I/I (gpad)	⁴ Net Area (ac)	Flow (gpd)	Conversion to cfs	Flow (cfs)	Drains to Node
1	R-1	0.227	4.405	2.69	74.25	880	1,000	1,880	0.627	1,179	1.547E-06	0.0018	SSMH C3
2	R-1	0.227	4.405	2.69	74.25	880	1,000	1,880	1.215	2,284	1.547E-06	0.0035	SSMH C3
3	R-3	0.061	16.393	2.69	74.25	3,274	1,000	4,274	3.620	15,473	1.547E-06	0.0239	SSMH C1
4	R-1	0.227	4.405	2.69	74.25	880	1,000	1,880	0.848	1,594	1.547E-06	0.0025	SSMH B7
	R-3	0.061	16.393	2.69	74.25	3,274	1,000	4,274	2.821	12,058	1.547E-06	0.0187	SSMH B7
5	R-3	0.061	16.393	2.69	74.25	3,274	1,000	4,274	10.576	45,205	1.547E-06	0.0699	SSMH B4x
	⁵ C-2	N/A	N/A	N/A	N/A	3,000	1,000	4,000	3.430	13,720	1.547E-06	0.0212	SSMH B4x
6	R-3	0.061	16.393	2.69	74.25	3,274	1,000	4,274	7.981	34,113	1.547E-06	0.0528	SSCO B1

¹See Page 4-6, Table 4-2 of WWMP

²Residential flows based on design ADWF per capita value of 99 gpcd & reduced by 25%: See Page 4-6, Table 4-2 of WWMP

³Inflow/Infiltration per City of Newberg's 2015 Design Manual

⁴Allocates 25% of area for roads and other public dedication: See Page 4-6, Table 4-2 of WWMP

⁵WWMP used 1,250 gpad; however with the uncertainty of what is being planned, this study increased it to 3,000 gpad

⁶Total WW Flow used as constant flow in XPSTORM model

WASTEWATER FLOW CALCULATIONS

BASIN	Zoning	¹ Average Lot Size (ac)	DU/Average Lot Size (DU/ac)	¹ People/ DU	² ADWF (gpcd)	Flow (gpad)	³ I/I (gpad)	Flow + I/I (gpad)	⁴ Net Area (ac)	Flow (gpd)	Conversion to cfs	Flow (cfs)	Drains to Node
A	R-1	0.227	4.405	2.69	74.25	880	1,000	1,880	2.703	5,081	1.547E-06	0.0079	See Onsite WW Flow Calculations
	R-3	0.061	16.393	2.69	74.25	3,274	1,000	4,274	29.985	128,165	1.547E-06	0.1983	
	⁵ C-2	N/A	N/A	N/A	N/A	3,000	1,000	4,000	3.430	13,720	1.547E-06	0.0212	
B	R-1	0.227	4.405	2.69	74.25	880	1,000	1,880	30.497	57,331	1.547E-06	0.0887	SSCO A1
	SD/V	N/A	N/A	N/A	N/A	1,250	1,000	2,250	20.952	47,142	1.547E-06	0.0729	SSCO A1
⁷ C	R-1	0.227	4.405	2.69	74.25	880	1,000	1,880	18.272	34,351	1.547E-06	0.0531	SSMH X3
⁷ D	R-1	0.227	4.405	2.69	74.25	880	1,000	1,880	28.407	53,405	1.547E-06	0.0826	SSCO A1
N/A	⁷ I	N/A	NA	N/A	N/A	2,000	1,000	3,000	24.320	72,960	1.547E-06	0.1129	WWMHJ111061

¹See Page 4-6, Table 4-2 of WWMP

²Residential flows based on design ADWF per capita value of 99 gpcd & reduced by 25%: See Page 4-6, Table 4-2 of WWMP

³Inflow/Infiltration per City of Newberg's 2015 Design Manual

⁴Allocates 25% of area for roads and other public dedication: See Page 4-6, Table 4-2 of WWMP

⁵WWMP used 1,250 gpad; however with the uncertainty of what is being planned, this study increased it to 3,000 gpad

⁶Total WW Flow used as constant flow in XPSTORM model

⁷Assumed zoning R-1 based on size of lots

XPSTORM OUTPUT

XPSTORM WASTEWATER CONVEYANCE DATA - EXISTING CONDITIONS FOR DOWNSTREAM 24" PIPE																			
CRESTVIEW CROSSING																			
Location			Conduit Properties			Conduit Results						Conduit Profile							
Link	Station		Diameter	Length	Slope	Design Capacity	Qmax/ Qdesign	Max Flow	Max Velocity	Max Flow Depth	y/d0	US Ground Elev.	DS Ground Elev.	US IE	DS IE	US Freeboard	DS Freeboard	US HGL	DS HGL
	From	To																	
			ft	ft	%	cfs		cfs	ft/s	ft		ft	ft	ft	ft	ft	ft	ft	ft
wwgm1187	WWMHJ102130	WWMHJ102131	2.00	133.00	3.00	39.18	0.00	0.00	0.00	0.00	0.00	184.19	185.10	174.27	170.08	9.92	15.02	174.27	170.08
wwgm1186	WWMHJ102131	WWMHJ111061	2.00	445.00	0.32	12.87	0.00	0.00	0.00	0.05	0.00	185.10	183.35	170.08	168.54	15.02	14.66	170.08	168.69
wwgm1183	WWMHJ111061	WWMHJ111062	2.00	393.00	0.25	11.35	0.01	0.11	1.06	0.15	0.08	183.35	190.78	168.54	167.35	14.66	23.30	168.69	167.48
wwgm1182	WWMHJ111062	WWMHJ111063	2.00	440.00	0.42	14.63	0.01	0.12	1.36	0.13	0.07	190.78	186.84	167.35	165.51	23.30	21.21	167.48	165.63
wwgm1181	WWMHJ111063	WWMHJ111064	2.00	495.00	0.50	16.00	0.01	0.11	1.39	0.12	0.06	186.84	182.91	165.51	163.00	21.21	19.79	165.63	163.12
wwgm1180	WWMHJ111064	WWMHJ120044	2.00	468.00	0.50	16.00	0.01	0.11	1.39	0.12	0.06	182.91	180.73	163.00	160.50	19.79	20.11	163.12	160.62
wwgm1179	WWMHJ120044	WWMHJ120045	2.00	502.00	0.52	16.34	0.01	0.11	1.42	0.12	0.06	180.73	168.92	160.50	157.75	20.11	11.11	160.62	157.81
wwgm1178	WWMHJ120045	WWMHJ120046	2.00	373.90	10.00	71.54	0.00	0.11	9.54	0.06	0.03	168.92	137.67	157.75	120.13	11.11	17.42	157.81	120.25
wwgm1177	WWMHJ120046	WWMHJ120047	2.00	436.00	0.60	17.47	0.01	0.11	1.50	0.12	0.06	137.67	140.78	120.13	117.53	17.42	23.14	120.25	117.64
XPSTORM WASTEWATER CONVEYANCE DATA - POST-DEVELOPED CONDITIONS FOR DOWNSTREAM 24" PIPE																			
CRESTVIEW CROSSING																			
Location			Conduit Properties			Conduit Results						Conduit Profile							
Link	Station		Diameter	Length	Slope	Design Capacity	Qmax/ Qdesign	Max Flow	Max Velocity	Max Flow Depth	y/d0	US Ground Elev.	DS Ground Elev.	US IE	DS IE	US Freeboard	DS Freeboard	US HGL	DS HGL
	From	To																	
			ft	ft	%	cfs		cfs	ft/s	ft		ft	ft	ft	ft	ft	ft	ft	ft
wwgm1187	WWMHJ102130	WWMHJ102131	2.00	133.00	3.00	39.18	0.02	0.61	4.53	0.17	0.09	184.19	185.10	174.27	170.08	9.75	14.71	174.44	170.39
wwgm1186	WWMHJ102131	WWMHJ111061	2.00	445.00	0.32	12.87	0.05	0.61	2.00	0.31	0.15	185.10	183.35	170.08	168.54	14.71	14.45	170.39	168.90
wwgm1183	WWMHJ111061	WWMHJ111062	2.00	393.00	0.25	11.35	0.06	0.72	1.91	0.36	0.18	183.35	190.78	168.54	167.35	14.45	23.12	168.90	167.66
wwgm1182	WWMHJ111062	WWMHJ111063	2.00	440.00	0.42	14.63	0.05	0.72	2.36	0.31	0.15	190.78	186.84	167.35	165.51	23.12	21.04	167.66	165.80
wwgm1181	WWMHJ111063	WWMHJ111064	2.00	495.00	0.50	16.00	0.05	0.72	2.55	0.29	0.14	186.84	182.91	165.51	163.00	21.04	19.62	165.80	163.29
wwgm1180	WWMHJ111064	WWMHJ120044	2.00	468.00	0.50	16.00	0.05	0.72	2.55	0.29	0.14	182.91	180.73	163.00	160.50	19.62	19.94	163.29	160.79
wwgm1179	WWMHJ120044	WWMHJ120045	2.00	502.00	0.52	16.34	0.04	0.72	2.59	0.29	0.14	180.73	168.92	160.50	157.75	19.94	11.03	160.79	157.89
wwgm1178	WWMHJ120045	WWMHJ120046	2.00	373.90	10.00	71.54	0.01	0.72	11.40	0.14	0.07	168.92	137.67	157.75	120.13	11.03	17.26	157.89	120.41
wwgm1177	WWMHJ120046	WWMHJ120047	2.00	436.00	0.60	17.47	0.04	0.72	3.38	0.28	0.14	137.67	140.78	120.13	117.53	17.26	22.98	120.41	117.80
Link54	SSMH X3	WWMHJ102130	0.83	681.00	0.46	1.47	0.41	0.61	2.49	0.39	0.47	193.32	184.19	177.67	174.27	15.26	9.75	178.06	174.44
Link35	SSMH X4	SSMH X3	0.83	67.65	0.40	1.37	0.40	0.55	2.39	0.37	0.45	196.98	193.32	178.14	177.67	18.47	15.26	178.51	178.06
Link36	SSMH X5	SSMH X4	0.83	153.50	1.00	2.17	0.25	0.55	3.35	0.29	0.34	193.62	196.98	179.88	178.14	13.45	18.47	180.17	178.51
Link37	SSMH X6	SSMH X5	0.83	98.00	0.40	1.37	0.40	0.55	2.36	0.38	0.45	196.98	193.62	180.47	179.88	16.13	13.45	180.85	180.17
Link53	SSMH B4x	SSMH X6	0.83	342.00	0.46	1.47	0.38	0.55	2.45	0.36	0.44	196.39	196.98	182.24	180.47	13.79	16.13	182.60	180.85
Link52	SSMH B5	SSMH B4x	0.83	241.00	0.49	1.51	0.31	0.46	2.40	0.32	0.39	194.19	196.39	183.61	182.24	10.26	13.79	183.93	182.60
Link49	SSMH C1	SSMH B5	0.83	490.00	2.59	3.49	0.10	0.33	4.05	0.17	0.21	205.39	194.19	196.50	183.61	8.72	10.26	196.67	183.93
Link48	SSMH C3	SSMH C1	0.83	624.00	0.83	1.97	0.16	0.31	2.64	0.22	0.27	214.38	205.39	201.85	196.50	12.31	8.72	202.07	196.67
Link47	SSCO A1	SSMH C3	0.83	143.50	4.13	4.41	0.07	0.30	4.64	0.15	0.18	219.98	214.38	207.98	201.85	11.85	12.31	208.13	202.07
Link50	SSCO B1	SSMH B7	0.83	86.00	0.63	1.72	0.06	0.11	1.77	0.14	0.17	193.43	193.17	185.98	185.24	7.31	7.76	186.12	185.41
Link51	SSMH B7	SSMH B5	0.83	307.00	0.47	1.48	0.09	0.13	1.63	0.17	0.21	193.17	194.19	185.24	183.61	7.76	10.26	185.41	183.93

FIGURE ES-2: MODELED INFRASTRUCTURE

